

**Site Investigation Sample and Analysis Plan
San Mateo Creek Legacy Uranium Sites
CERCLIS ID NMN00060684 7
Cibola and McKinley Counties, New Mexico**



Superfund Oversight Section
Ground Water Quality Bureau
New Mexico Environment Department

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Introduction

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 United States Code (U.S.C.) §§ 9601 to 9675 ("CERCLA"), the New Mexico Environment Department (NMED) Superfund Oversight Section will conduct a Site Investigation ("SI") of the San Mateo Creek legacy uranium sites ("Site"), Cibola and McKinley Counties, New Mexico (CERCLIS ID NMN00060684). The investigation will gather information and acquire sampling data to evaluate the site using the Hazard Ranking System (HRS) and the Superfund Chemical Data Matrix ("SCDM") to determine if threats to human health and the environment exist such that further action under CERCLA is warranted.

Site Description

The San Mateo Creek basin (Hydrologic Unit Code ["HUC"] 1302020703), by which the boundary of the Site is defined, comprises approximately 321 square miles within the Rio San Jose drainage basin in McKinley and Cibola counties, New Mexico. This basin is located within the Grants Mineral Belt ("GMB"), which is an area of uranium mineralization occurrence approximately 100 miles long and 25 miles wide encompassing portions of McKinley, Cibola, Sandoval and Bernalillo counties, and includes the Ambrosia Lake mining district. Main access into the Site is provided by New Mexico State Roads 605 and 509.

The San Mateo Creek basin contains 85 legacy uranium mines with recorded production and 4 legacy uranium millsites. One of these millsites, the Homestake Mining Company Superfund Site ("HMC;" CERCLIS ID NMD007860935), currently is undergoing ground water remediation activities in 4 aquifers under the primary jurisdiction of the U.S. Nuclear Regulatory Agency ("NRC"). Background concentrations of constituents of concern (a.k.a., clean-up levels) for these 4 aquifers generally exceed federal and state drinking water standards. The origin of these elevated background contaminant concentrations is thought to be due, in part, to contamination from upgradient legacy uranium mine and mill sites within the basin. Far upgradient geochemical data from HMC suggest that overall alluvial ground water quality relative to drinking water standards, is worse than in the immediate upgradient vicinity of HMC, possibly due to the continuing migration of ground water that is impacted from the high concentration of legacy uranium sites in this area of the basin.

Sampling activities

For this phase of the Site Investigation, NMED proposes to sample ground water from existing wells between the north side of HMC and approximately the junction of New Mexico state highways 509 and 605. The purpose of this sampling is to determine if contaminant concentration and other hydrochemical changes can be discerned, especially within the alluvial aquifer, which would indicate continuing downgradient contaminant

migration from legacy uranium sites within the Ambrosia Lake mining district of the San Mateo Creek basin. NMED has already identified over 20 wells in this area for sampling; these wells would be sampled during October 2008. Due to the remote location of many other existing wells and logistics of access, NMED proposes to collect samples from wells as they are located in the field, and to submit all samples for total and dissolved metals analyses monthly to the EPA Contract Laboratory Program for analyses. Ground water samples for TDS, nitrite/nitrate, carbonate, and bicarbonate analyses would be submitted to the New Mexico State Laboratory Division ("SLD") since these have shorter holding times (see Table 1). NMED also requests EPA assistance in performing analyses for radionuclide analyses (e.g., radium²²⁶⁺²²⁸, gross alpha and gross beta), and radionuclide isotopes, as these are essential both to characterize ground water contamination and to establish possible anthropogenic source attribution.

Water samples at each domestic well location will be collected from an access point closest to the well head if there is a dedicated pump already installed and operational. Well locations without a dedicated pump will require the utilization of a portable submersible pump or similar apparatus. Domestic wells will be purged for 15 minutes or until field parameters (e.g., pH, conductivity, temperature) stabilize. Samples will be collected in the appropriate containers and preservatives, placed in insulated coolers with ice, and shipped to the laboratories specified by the CLP. Samples that will be analyzed by SLD also will be collected within appropriate containers supplied by SLD, and transported to the laboratory for submittal within analysis-specific holding time periods. All samples that are collected in this program will utilize chain-of-custody handling procedures.

Worker safety and the safe sampling of wells in the field will follow the requirements described in Site Safety Plan (Attachment 1). All field personnel will work in teams of at least 2 individuals, and shall have communication availability with project leaders. The collection of a representative ground water sample will follow the guidance described in the SOP, Section 7 – Ground Water Sampling, (Attachment 2). Level D is the appropriate Personal Protection Equipment ("PPE") level for the sampling of the proposed well locations.

The appropriate level of documentation for the field sampling event, sample chain-of-custody forms, laboratory results, and the site safety plan are the responsibility of the Project Management Team Leaders, David L. Mayerson and Al Pasteris.

Table 1. Proposed ground water analytes for proposed Site Investigation ground water sampling for the San Mateo Creek legacy uranium sites, Cibola and McKinley counties, New Mexico.

A. Field parameters

Parameter
Electrical conductivity (EC)
pH
Temperature
Dissolved oxygen (DO)
Oxidation-reduction potential (ORP or Eh)

B. Laboratory analyses through CLP

Analyte (Total & Dissolved)	MAXIMUM [^] Required Detection Limit (µg/L)
pH	-
Carbonate (CO ₃)	-
Chloride (Cl)	250,000
Fluoride (F)	1,600
Sulfate (SO ₄)	250,000
Calcium (Ca)	5000
Magnesium (Mg)	5000
Sodium (Na)	5000
Potassium (K)	5000
Aluminum (Al)	50
Antimony (Sb)	6
Arsenic (As)	10
Barium (Ba)	200
Beryllium (Be)	4
Cadmium (Cd)	5
Chromium (Cr)	50
Cobalt (Co)	50
Copper (Cu)	1000
Iron (Fe)	1000
Mercury (Hg)	2
Manganese (Mn)	50
Nickel (Ni)	200
Lead (Pb)	15
Molybdenum (Mo)	1000
Silver (Ag)	50
Selenium (Se)	35
Thallium (Tl)	2
Uranium (U)	30

Vanadium (V)	50
Zinc (Zn)	5000

C. Non-standard additional analyses requested through EPA CLP

Analyte	Required analytical detection limit
Gross Alpha	15 pCi/L
Radium-226 + 228 ($^{226}\text{Ra} + ^{228}\text{Ra}$)	5 pCi/L
Gross Beta	NS

Radium-226 (^{226}Ra)
Radium-228 (^{228}Ra)
Uranium-238 (^{238}U)
Uranium-235 (^{235}U)
Uranium-234 (^{234}U)
Thorium-232 (^{232}Th)
Thorium-230 (^{230}Th)
Isotopes
Delta Carbon-13 ($\delta^{13}\text{C} \text{ ‰}$)
Delta Deuterium ($\delta\text{D} \text{ ‰}$)
Delta Oxygen-18 ($\delta^{18}\text{O} \text{ ‰}$)
Delta Sulfur-34 ($\delta^{34}\text{S} \text{ ‰}$)
Delta Nitrogen-15 ($\delta^{15}\text{N} \text{ ‰}$)

D. Laboratory analyses through SLD

Analyte	Required analytical detection limit
Total dissolved solids (TDS)	500,000 $\mu\text{g/l}$
Nitrate + nitrite ($\text{NO}_3 + \text{NO}_2$)	10,000 $\mu\text{g/l}$
Bicarbonate (HCO_3)	NS
Carbonate	NS

NS=not specified

Attachment 1: Site Safety Plan

Personal Protection

Level of Protection (anticipated): D

Protective Clothing: Steel-toe boots and disposable nitrile gloves.

Surveillance Equipment: NA

Decontamination Procedures

Personnel: Wash any exposed skin with soap and water.

Equipment: Wash with liquinox, rinse with de-ionized water.

Contaminants of Concern:

Uranium, molybdenum, selenium, radium₂₂₆₊₂₂₈, nitrates (a NIOSH book is on site for reference.)

Other potential workplace hazards:

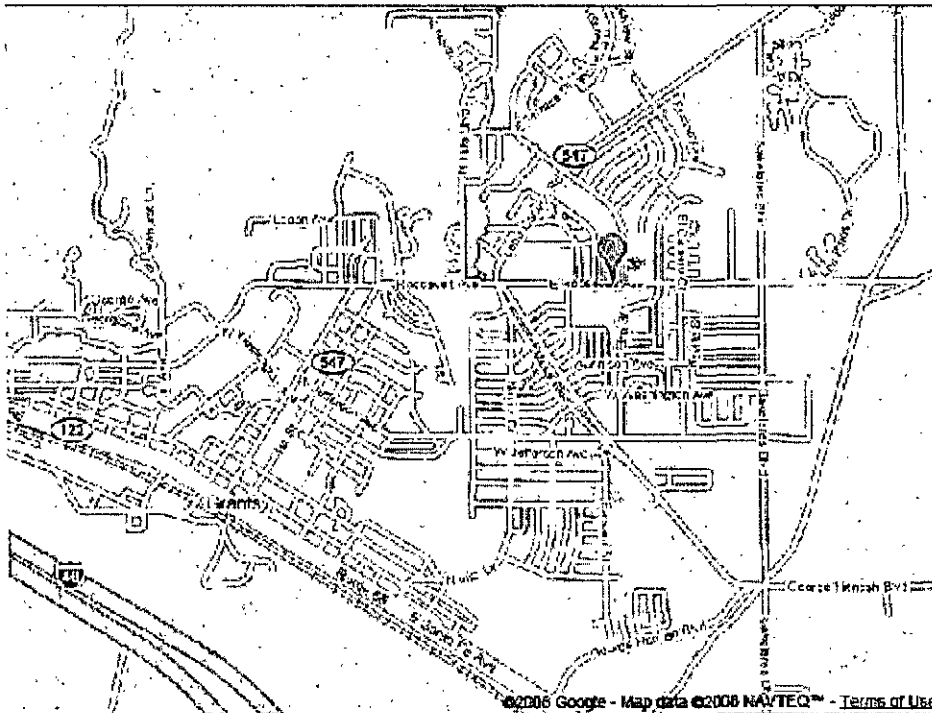
1. Slips, trips, and falls
2. Poisonous snakes
3. Heat dehydration/exhaustion/stroke
4. One large diameter open wellbore without barricade
5. Potential for vehicle miring in mud when raining on mill site
6. Low overhead pipes in supply wellhouses

Emergency Information

Hospital: Cibola General Hospital
1016 Roosevelt Avenue
Grants, NM 87020
(505) 287-4446

A. Cibola General Hospital

1018 E Roosevelt Ave, Grants, NM - (505) 287-4448



Facilities for Toxic Waste Related Emergency:

Milan Fire Department: (505) 287-3776

Hazardous Waste Bureau 24-hour Emergency number: (505) 827-1557

Telephone Numbers:

Ambulance: 911

Poison Control Center: (800) 432-6866

Police: 911 or (505) 894-6617

Fire Department: (505) 287-3776

NMED: (800) 219-6157

New Mexico Emergency Response: (505) 827-1557

Other:

Be careful to avoid slip, trip, and fall hazards. Stray dogs, insects, sunburn, and windburn are potential problems in this area. Avoid inciting dogs, wear gloves, and sunscreen. Drink plenty of water.

I have been briefed on the San Matco Creek legacy uranium sites

Signature

Printed Name

Date

Signature

Printed Name

Date